Load-Bearing Underwater Cable for Hand-Hauled, Real-Time Profiling

Profiling in real time, from small boats not equipped with a winch, calls for hand hauling a CTD using a load-bearing data cable. Sea-Bird can supply cables up to 300 meters (985 feet) in length that provide a practical way to hand-haul SBE 19 / 19*plus* / 19*plus* V2 SeaCAT Profilers or SBE 25 / 25*plus* Sealoggers CTDs, and acquire CTD profile data in real time. In these cases the CTD is powered by its battery, and the cable allows two-way* RS-232 communications (3 conductors - *transmit*, *receive*, and *common*) and bears the weight of the CTD.

The cable is not intended for static working loads above 45 kg (100 lbs); working loads above 18 kg (40 lbs) may be difficult to handle without a winch. The minimum recommended cable bend radius is 10 cm (4 inches) (e.g., 20 cm sheave block nominal diameter). **Use with loads exceeding 45 kg (100 lbs) or cable bend radius less than 10 cm (4 inches) will reduce the cable's useful life and void the warranty.**

Attached drawings show the cable assembly and wiring details, and include tables of Sea-Bird part numbers for cables of specific lengths:

- Drawing No. 32284 –
  Standard connector to the CTD and 9-pin connector to the computer

- Drawing No. 32643 –
  Wet-pluggable connector to the CTD and 9-pin connector to the computer

- Drawing 32821 –
  Standard connector to the CTD and 4-pin connector to a SeaCAT / Sealogger RS-232 & Navigation Interface Box (Interface Box PN 90488 or PN 90545)

If the length needed is not listed on the drawing, contact Sea-Bird with the drawing number and desired length (300 meter [985 feet] maximum).

* Notes:

- Communications **from the CTD to a computer** - An SBE 19, 19*plus*, 19*plus* V2, 25, or 25*plus* CTD reliably transmits data over 300 meters (985 feet) of cable to a computer. See the applicable CTD manual for baud rate and real-time output rate limitations.
- Communications **from a computer to the CTD** for instrument setup, data upload, etc. are dependent on the computer serial port hardware and software settings, but are usually reliable over cables up to 300 meters long at low baud rates. Some laptop computers may have inferior serial port hardware, limiting the cable length over which they can transmit. If a computer cannot transmit over a long cable, disconnect the CTD from the long cable and connect to the computer using the shorter I/O cable provided with the CTD.

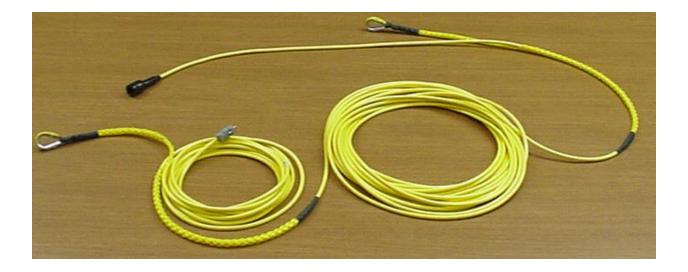## Using Load-Bearing Cable for Real-Time Data Acquisition with Seasave

1. Communicate with the CTD via the terminal program* to set up sampling parameters, initialize memory, etc. (see terminal program Help Files).
2. Configure Seasave for real-time acquisition and display (see Seasave Help files).
3. Start the CTD sampling via magnetic switch (or with computer command in the terminal program* per CTD manual instructions).
4. Deploy the CTD to begin profile.
5. Recover the CTD.
6. Stop the CTD sampling via magnetic switch (or with computer command in the terminal program*).
7. Communicate with the CTD via the terminal program* to upload data.

*Note: Sea-Bird has several terminal programs for communicating with instruments -
- SBE 19, 19*plus*, and 25: use Seaterm terminal program
- SBE 19*plus* V2 and 25*plus*: use SeatermV2 terminal program

Cable Specifications

- Nominal O.D. 7 mm (0.270 in.)
- Twisted trio of 22 awg conductors
- Pressure-extruded polyurethane jacket, dull, non-slip finish
- Weight in air approximately 50 grams/meter (0.034 lbs/ft)
- Weight in water approximately 4 grams/meter (0.0027 lbs/ft)
- PMG-4FS connector with locking sleeve to CTD and DB-9 serial data connector to computer - Drawing 32284
- MCIL-4FS wet-pluggable connector with locking sleeve to CTD and DB-9 serial data connector to computer - Drawing 32643
- PMG-4FS connector with locking sleeve to CTD and MS3106A-14S-2P connector to Seacat/Sealogger RS-232 & Navigation Interface Box - Drawing 32821
- Mechanical terminations are *Chinese finger trap* type, made from hollow-core, polypropylene rope with stainless thimbles
- Internal Kevlar braid with 180 kg (400 lb) breaking strength
- **Maximum recommended working load 45 kg (100 lbs)**
- **Minimum recommended cable bend radius 10 cm (4 inches) (e.g., a 20-cm sheave block nominal diameter)**

Revision Record

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
3.02	A	Redrawn on new template		LRG	MJ
06.02	B	Add 17097, Step 5	CB	KLP	CB
08.02	C	See ECN 726	DB	MJ	CB
9.23.02	D	ADJ. QTY & LENGTH	CB	KLP	
10.11.02	E	CHANGED BREAK STRENGTH	DB	KLP	
7.17.06	F	ECN 971, ALT WIRE COLOR	CB	CB	
9.6.2006	G	ECN 991 — Process Change	CB	MJ	

BRAID AND LIFT-EYE INSTALLATION

① BRING CABLE THROUGH BRAID
   20 +/- 2 INCHES BEHIND EYE
② 1/2" DIA. HEATSHRINK ADHESIVE TUBING 3", PN 31568
③ INSTALL CONNECTOR AFTER INSTALLING BRAIDED SPLICES

Pin Table

P1 PMG-4FS	COLOR	ALT COLOR	P2 DB-9S
PIN 1	WHITE	WHITE	PIN 5
PIN 2	WHITE/BLACK	BLACK	PIN 3
PIN 3	WHITE/RED	RED	PIN 2
PIN 4	---	---	---

CABLE TYPE: FALMAT
SBE PN 171285, Pigtails per dwg 32275

FM020999S1 REV. B
POLYURETHANE, KEVLAR REINFORCED, 3 CONDUCTOR, 22 AWG.
YELLOW JACKET, NOMINAL O.D. = 0.270 IN.
100 LBS. WORKING LOAD (45 Kg)
4 INCH MINIMUM BEND RADIUS (10 cm)

DB-9S, SBE PN 17096
HOOD, SBE PN 17097

SBE PN 801676, Eye Splice Assembly (2 each)

PMG-4FS W/ LOCKING SLEEVE G-FLS-P

20" +/- 2"

Cable Dimension Table (upper)

SBE PN	PIGTAIL	DIM A		DIM B	DIM C
801833	172476	775 FT	236 m	52 IN	20 FT
801885	172546	20 FT	6 m	52 IN	6 FT
801886	172547	250 FT	76 m	52 IN	20 FT
801910	172602	230 FT	70 m	52 IN	20 FT

Cable Dimension Table (lower)

SBE PN	PIGTAIL	DIM A		DIM B	DIM C
801140	171283	200 FT	60 m	52 IN	20 FT
801148	171301	600 FT	182 m	52 IN	20 FT
801150	171284	100 FT	30 m	52 IN	20 FT
801153	171306	330 FT	100 m	52 IN	20 FT
801293	171543	500 FT	152 m	52 IN	20 FT
801295	171551	165 FT	50 m	52 IN	20 FT
801301	171560	415 FT	125 m	52 IN	20 FT
801304	171581	83 FT	25 m	52 IN	20 FT
801307	171588	985 FT	300 m	52 IN	20 FT
801340	171654	528 FT	160 m	52 IN	20 FT
801352	171681	66 FT	20 m	52 IN	20 FT
801358	171690	660 FT	200 m	52 IN	20 FT
801514	172224	131 FT	40 m	52 IN	20 FT

Title Block

SEA-BIRD ELECTRONICS, INC

DRAWN BY: RMB
APPROVED BY:
SCALE: NTS
P/N: See Table
TITLE: Load Bearing Data Cable PMG-4FS to DB-9S
DRAWING NUMBER: 32284
REV: G
DATE: 4.26.99

TOLERANCES
FRACTIONAL
DECIMAL
ANGULAR

P2 DB-9S

P1

Revision Record

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
0.3.02	A	Add Adhesive Tubing	MJ	CB	
8.29.02	B	CHANGED LENGTH	CB	KLP	
9.23.02	C	ADJ. QTY , LENGTH & PN	CB	KLP	
10.7.02	D	FIXED CONN DWG AND LS DESC	CB	KLP	
10.11.02	E	CHANGED CABLE BREAK STRENGTH	CB	KLP	
9.18.06	F	ECN 971 — COLOR CHANGE ECN 991 — PROCESS CHANGE	CB	MJ	

CABLE TYPE: FALMAT
SBE PN 171285, Pigtails per dwg 32642

FM020999SA1 REV. B
POLYURETHANE, KEVLAR REINFORCED, 3 CONDUCTOR, 22 AWG.
YELLOW JACKET, NOMINAL O.D. = 0.270 IN.
100 LBS. WORKING LOAD (45 Kg)
4 INCH MINIMUM BEND RADIUS (10 cm)

DB-9S, SBE PN 17096
HOOD, SBE PN 17097

P2

SBE PN 801676, Eye Splice Assembly (2 each)

DIM A

DIM C

DIM B

20" +/- 2"

20" +/- 2"

MCIL-4FS W/ LOCKING SLEEVE MCDLS-F

SBE PN	PIGTAIL	DIM A	DIM B	DIM C
801337	171633	330 FT	52 IN	20 FT
801338	171634	660 FT	52 IN	20 FT
801371	171707	100 FT	52 IN	20 FT
801372	171708	200 FT	52 IN	20 FT
801860	172494	165 FT	52 IN	20 FT

P1 MCIL-4FS	COLOR	ALT COLOR	P2 DB-9S
PIN 1	WHITE	WHITE	PIN 5
PIN 2	WHITE/BLACK	BLACK	PIN 3
PIN 3	WHITE/RED	RED	PIN 2
PIN 4	---	---	---

BRAID AND LIFT-EYE INSTALLATION
1 BRING CABLE THROUGH BRAID
  20 +/- 2 INCHES BEHIND EYE
2 1/2" DIA. HEATSHRINK ADHESIVE TUBING 3", PN 31568
3 INSTALL CONNECTOR AFTER INSTALLING BRAIDED SPLICES

LOCATING PIN

P2

Title Block

SEA-BIRD ELECTRONICS, INC

LOAD BEARING DATA CABLE
MCIL-4FS

P/N	SEE TABLE	SCALE NTS	DRAWN BY MJ
			APPROVED BY

DWG. NO. 32643

DATE 9.18.2006   SHEET 1 of 1   REV. F

SEA–BIRD ELECTRONICS, INC

TITLE: Load Bearing Data Cable PMC-4FS to MS
DRAWING NUMBER: 32821
REV: B
DRAWN BY: KLP
SCALE: NTS
P/N: See Table
DATE: 9.18.06

TOLERANCES
FRACTIONAL
DECIMAL
ANGULAR

REVISION RECORD

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
7/06	A	ECN 971, ALT WIRE COLOR	CB	CB	MJ
9.18.06	B	ECN991 – Process Change	CB		

MS3106A–14S–2P
SBE PN 17412

③

CLAMP 97-3057-6A
SBE PN 17413

BUSHING MS3420-6
SBE PN 17414

SBE PN 801676, Eye Splice Assembly (2 each)

20" +/- 2"
20" +/- 2"

①
②
②
①

PMG-4FS W/ LOCKING SLEEVE G-FLS-P

P1

DIM A
DIM B
DIM C

CABLE TYPE: FALMAT
SBE PN 171285, Pigtails per dwg 32275

FM020999SA1 REV. B
POLYURETHANE, KEVLAR REINFORCED, 3 CONDUCTOR, 22 AWG.
YELLOW JACKET, NOMINAL O.D. = 0.270 IN.
100 LBS. WORKING LOAD (45 kg)
4 INCH MINIMUM BEND RADIUS (10 cm)

SBE PN	PIGTAIL	DIM A		DIM B	DIM C
801442	171551	165 FT	50 m	52 IN	20 FT
801443	171808	33 FT	10 m	52 IN	20 FT
801865	171284	100 FT	30 m	52 IN	20 FT

P1 PMG-4FS	COLOR	ALT COLOR	P2 MS3106A-14S-2P
PIN 1	WHITE	WHITE	PIN A
PIN 2	WHITE/BLACK	BLACK	PIN B
PIN 3	WHITE/RED	RED	PIN C
PIN 4	--	--	--

BRAID AND LIFT-EYE INSTALLATION
1 BRING CABLE THROUGH BRAID
2 +/- 2 INCHES BEHIND EYE
2 1/2" DIA. HEATSHRINK ADHESIVE TUBING 3", PN 31568
3 INSTALL CONNECTOR AFTER INSTALLING BRAIDED SPLICES

AN59 Revised 9/2024